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Diagnosis and Treatment of Diseases of the Digestive System in Cows.

REVIEW OF UDALL'S INVESTIGATIONS.*

By J. T. EDWARDS, B.Sc., M.R.C.V.S.

Affections of this group are often complex, and their aspect so changed by intercurrent diseases and complications that only evidence obtained on post-mortem examination can make the facts clear. As a basis for comparison, Udall made a study of approximately 200 cases of what he calls primary indigestion and 50 of traumatic peritonitis. Acute diffuse peritonitis and acute primary indigestion are two diseases that are easily confused; each under favourable circumstances is not difficult to recognise, and yet the termination occasionally reveals a condition that was not anticipated.

Acute diffuse peritonitis may be secondary to the following causes:—

(1) Perforation of the reticulum by a sharp body (traumatic peritonitis).

(2) Infection of the uterus (puerperal peritonitis). Infection gains entrance to the peritoneum through spontaneous rupture of a pregnant uterus; this may occur in twin pregnancy at about the seventh month, when the wall ruptures and one or both fœtuses escape into the abdominal cavity. This condition has been observed in advanced pregnancy, where the fœtus lies on its back and injures or even perforates the uterus with its hind feet. Occasionally the uterus is ruptured by an irrigating tube. The most obscure form of puerperal peritonitis occurs from an abscess around the uterus; a suppurative inflammation of the Fallopian tubes (pyosalpinx) leading to an extension of infection from the tubes may explain the occurrence of abscesses and other forms of infection from this source.

(3) Specific infection, such as tuberculosis or necrobacillosis, is a comparatively infrequent cause of acute diffuse peritonitis.

Primary Indigestion is the most frequent acute disease of the digestive system in cows. It is an atony of the fore-stomachs induced by an overloading of the rumen and reticulum with food or indigestible substances, and it results in impaction of the rumen, tympany, or bowel catarrh, depending on the material. Occasionally an excessive mass accumulates in the omasum and abomasum. The milder forms, in which diagnosis and treatment are simple, need not be considered. In Udall's experience the condition was practically unknown to occur among grazing cows. For this reason a diagnosis of severe primary indigestion between the months of May and September is to be made with caution. During this period it is possible for a cow to obtain spoiled food, or unreasonable amounts of food to which she is not accustomed; but these occasions are not frequent, and when they do occur are usually recognised.

The *history* of a traumatic or puerperal acute peritonitis nearly always records a sudden onset. The milk secretions and appetite suddenly cease, often within a period of twelve hours. Primary indigestion with so sudden a development has a history of accidental over-eating, so manifest that even the owner often knows the cause and nature of the disease. When a doubtful case has a history extending back four or five days to a week or more, and laxatives have not been followed by decided improvement, traumatic peritonitis deserves serious consideration. In Udall's experience, cases of this type that were diagnosed as chronic indigestion or chronic constipation proved to be traumatic peritonitis. When doubtful cases fail to improve after about three days of treatment, there is increased reason to suspect peritonitis, and this is especially true when laxatives are followed by slight, involuntary, non-fœtid, watery evacuations rich in mucus. When an owner gives the information on the first call that the cow has been sick with indigestion for one week, two weeks, or three weeks, and that she has received salts or oil with slight improvement, the condition is rarely a primary indigestion. When a small body migrates between the reticulum and abomasum, in the non-sensitive visceral peritoneum, evacuation of the rumen may be followed by decided improvement; this is deceptive, for a gradual loss in condition and strength progressively occurs, until after a short time the apparent improvement is no longer seen.

Information with regard to the food consumed and the manner in which it was obtained is often essential to an accurate diagnosis. The more severe primary types are due to eating unlimited amounts of food, as obtained from accidental access to grain, to eating spoiled food that is heated, frozen, mouldy, rotten, or contaminated with filth, to careless and ignorant feeding, combined with neglect of the sick, and to the predisposing influence of advanced pregnancy, parturition, and fatigue. Advanced pregnancy and parturition are responsible for frequent errors in diagnosis. A puerperal condition should but be considered as contributory to indigestion unless the diagnosis of indigestion is also warranted by dietetic

* UDALL, D. H., *The Cornell Veterinarian*, 1921, July. Vol. II., No. 3, pp. 200-210.

errors; it introduces about 50 per cent. of all cases of traumatic peritonitis, some of which are diagnosed as indigestions until their real nature is revealed by an autopsy. Severe primary indigestion is relatively infrequent in cows fed heavily for advanced records, for the feeding is systematic, the food of good quality, and the sick are given prompt attention. In Udall's experience it does not frequently occur from eating indigestible substances, and from change of food. Impactions of the omasum followed upon eating coarse chaff, grass that had been dried after complete freezing, and coarse bran; this form is not mild. Inflammation of the rumen and reticulum with diffuse hæmorrhagic infiltration follows upon accidental over-eating of heavy grain. In cases where acute tympany does not occur acute indigestion that eventually terminates fatally leads to gastro-enteritis, and only rarely to peritonitis. Among the 200 cases of primary indigestion studied, not one severe case of diffuse acute peritonitis came to be examined post-mortem, except in such cases as those in which oil-can spouts and other like implements had been employed instead of a trocar for puncturing the stomachs. In differential diagnosis, then, it appears important to study carefully the symptoms and diagnosis of acute diffuse peritonitis, for this condition is not infrequently diagnosed as indigestion.

Attitude. In primary indigestion of moderate severity the animal is dull, sometimes emits an expiratory grunt, and assumes a standing position. When turned loose with the herd it tends to go with the others. Colicky symptoms, such as restlessness, sweating, stamping, kicking the belly with the hind feet, and switching the tail, are usually manifestations of tympany, or "griping" of the intestines; they are most marked after overloading with spoilt food, which causes acute bowel catarrh. This type of pain is also manifested in the early stages of intussusception, but a rectal examination is usually sufficient for differentiation.

In peritonitis, on the other hand, the animal tends to assume a recumbent position; the patient is often found lying down, and when turned loose with the herd it tends to remain behind. Pain is exhibited by an expiratory grunt, stiffness of the body, slow walking when forced to move, shallow breathing, with a long pause at the end of inspiration, followed by a short expiration. The violent movements characteristic of the acute griping of bowel catarrh are not often present; they are sometimes seen when a foreign body begins to migrate, but when the peritonitis is established, the attitude becomes cautious. The size and shape of a foreign body in traumatic peritonitis influence the attitude. The repeated impact of a three-inch wire against the peritoneum may cause distress during the entire course of the disease. If the foreign body is small, the symptoms of pain are more obscure. Large nails held in the reticulum by the head are less painful than pieces of wire of the same length. A sharp body migrating between the reticulum and the abomasum may give rise to no pain on account of the absence of sensation in the visceral peritoneum. When, however, a sharp wire is located so that it constantly impinges upon the parietal peritoneum, which is extremely sensitive, there is marked distress. Traumatic gastritis may be suspected when the colic and restlessness, which are indicative of sharp-cutting pain, are not accompanied by symptoms of tympany or intestinal fermentation. The pain of peritonitis may in general be described as continuous, while the pain of acute bowel catarrh is what may be termed colicky. A staggering gait and symptoms similar to those of parturient paresis may result from overeating fermentable foods such as apples or green maize fodder, and should not be confused with the collapse of weakness, which is a prominent symptom in peritonitis indicative of toxæmia or septicæmia. Marked trembling, as is especially frequently seen behind the shoulder, is, when associated with weakness, very suggestive of peritonitis; progressive loss of strength and condition is likewise suggestive of this disease.

The mucous membranes are only slightly changed in the primary forms of indigestion, whereas in peritonitis the conjunctival vessels are often prominent and the eyes appear "blood-shot."

The skin shows no special change in either form. The muzzle may remain moist until near the point of death, although in primary indigestion there seems to be a greater tendency towards dryness. Œdematous swellings in the submaxillary region have been observed only in the terminal stage in the progress of a case where there is traumatic injury affecting the heart. Inflammatory swellings of the extremities (tendon-sheaths, joints) may appear as manifestations of pyæmia or septicæmia in subacute or chronic peritonitis. Skin swellings have not been observed in either of the diseases in question.

Fever. The temperature and general signs of fever fail to afford any differential characteristics; in either form the temperature is often 102°-104°F. Udall's records showed that it was within half a degree of 103 in the great majority of cases; it was never found to be above 104, and there was a tendency towards a slight daily drop. In two cases the temperature remained near 103 and the pulse 50 to 60, until within 24 to 48 hours of death. It is probable that the low temperature depends upon the severity of the infection, and on the failure of the animal to react against it. In the milder forms of intoxication, due to primary indigestion, the temperature frequently rises much higher than in peritonitis. In both the extremities are cool. Usually the muzzle is dry, but the appearance of moisture up to within three days of the termination of the illness was observed in a case of diffuse peritonitis that ended fatally in two weeks. A slight or diffuse serous or mucous discharge from the nostrils may be transient or persistent; it is a sign of toxæmia or septicæmia that may occur in gastro-enteritis or peritonitis. It is not, as is sometimes stated, a characteristic feature of peritonitis.

Pulse. In a typical case of peritonitis the pulse is about 60 at first; it then goes up, with slight daily fluctuations, to 80 or 90, or even to 100 one or two days before death. In the meantime the temperature gradually falls. A pulse rate of 50 or 60 may be

maintained until near the end. One case that showed a pulse rate of 90 to 100 for three days dropped to 75 within 24 hours after the administration of 50c.c. of fluid extract of digitalis. So far as the records showed, there seemed to be no marked difference in the pulse rate and temperature of the two diseases, except that the pulse gradually increased in frequency in one until death took place, and in the other, where recovery was the rule, it receded. In both variations were frequent. A slow pulse rate in peritonitis has no relation to prognosis.

The respiration in peritonitis is extremely irregular; the rate recorded daily varies between 20 and 50, or even more. The abdominal movements are greatly reduced, so that the breathing is chiefly costal in type, shallow and catchy.

Digestive System. Complete loss of appetite and suspended rumination are common to both types. Examination of the rumen may reveal useful differential symptoms. Overloading of the rumen to such a degree as to induce severe general symptoms is apt to cause a decided increase in the size of the abdomen. If the rumen contents are fermentable, the onset is marked decidedly by tympanitis; if they are dry, a rectal examination may reveal overloading or impaction.

If the omasum is impacted, one finds distinct soreness on percussion over this organ on the right side, and in some cases over the small intestines in the same region; this condition may be introduced by severe colic lasting for hours. It is probable that in these cases the small intestines and abomasum are also involved.

Extreme overloading of the abomasum, an infrequent type of affection, tends to paraplegia from secondary encephalitis, as well as bowel catarrh. In the latter condition the fæces tend to be fœtid from the beginning. In one case of overloading of the abomasum vomiting was an early symptom.

When symptoms of overloading or bowel catarrh fail to manifest themselves, and the history does not clearly indicate overeating, the evidence as to primary indigestion is negative. If there is an early distressing tympany, if a rectal examination shows a marked increase in the size, or an impaction, of the rumen, or the animal has eaten decidedly indigestible or spoiled food, the evidence as to primary indigestion is positive.

Tympany, with an accumulation of gas between the rumen and the abdominal wall in the left flank, is, in some cases, a useful diagnostic sign of peritonitis. Accumulation of gas in the abdominal cavity is due in part to escape of gas from the reticulum, and to inflammatory peritoneal products. In primary indigestion leading to fatal gastro-enteritis tympany may appear at the onset, but after it has once been controlled, it is not apt to become again a prominent symptom. The tympany of acute diffuse peritonitis tends to persist until the end.

Paralysis of the muscular walls of the stomach and intestines is responsible, in both diseases, for the predominant digestive symptoms. The effect of acute peritonitis or severe overloading is to induce atony. When the contractions of the rumen are unequal in force and the explosive sounds are irregular, the primary type of indigestion is suggested. In the presence of equally severe general symptoms, peristalsis may be present for a longer time in peritonitis than in primary indigestion; this is probably explained by the fact that in the latter condition the entire disturbance depends on changes in the stomach and intestines. The contractions of the rumen, as revealed by the phonendoscope, may be identical in both types. If, after having listened with the phonendoscope for five minutes one is unable to hear a contraction of the rumen or a peristaltic sound, gastro-enteritis or peritonitis should be strongly suspected. In cases running a course of one week or less Udall was unable to re-establish these contractions in either disease. In the usual case of peritonitis running a course of two weeks, he was deceived by ability to re-establish regular, though weak, contractions of the rumen and a slight degree of peristalsis. Improvement in the degree of peristalsis should not by itself, therefore, be accepted as a sign that convalescence has started.

Pain on percussion with a heavy hammer or kneading with the first finger or thumb between each intercostal space may be so marked as to justify a positive diagnosis of foreign body peritonitis. In primary indigestions cows frequently show pain on percussion over the reticulum, but this pain is not intense, nor is it induced by slight pressure. When a sharp object gravitates in the visceral peritoneum, between the reticulum and abomasum, for example, pain on percussion may be absent during the entire course. Nervous cows appear to be sore on percussion over the reticulum, but this gradually wears off as the animal becomes accustomed to the presence of the veterinarian. When a diffuse acute peritonitis is well developed, kneading of the abdomen at any point may cause discomfort. As the inflammation spreads, pain may be most pronounced at a point remote from the original injury—for example, in the right flank—when it suggests intussusception. Experience and judgment are essential to an accurate estimate of the results of percussion.

Rectal examination is in most cases only of indirect value. Pain on manipulation through the rectum suggests inflammation of the peritoneum; this is doubly convincing when the examination is accompanied by an expiratory grunt with each breath and the rate of breathing is increased. When adhesions and fibrinous exudate are abundant, one may be unable to outline organs like the uterus and bladder that normally are distinct.

Bowel evacuations. In both types the fæces are often scanty and dark, and complete suppression is not infrequent. In peritonitis the administration of a purgative is followed by the involuntary evacuation of scanty, watery fæces, which may be fœtid and are rich in mucous. An abundance of mucous in the fæces is also observed in gastro-enteritis.

The characteristic signs of peritonitis are, therefore, briefly, as follows:—

1. Occurrence during a season when primary indigestions are rare.

2. Failure to establish the presence of a dietary error sufficient to induce serious sickness, especially in advanced pregnancy.

3. Loss of appetite, weakness, and loss in condition persist after a scanty watery purge rich in mucous.

4. Accumulation of gas between the rumen and abdominal wall.

5. Decided pain on percussion or pressure. An attitude of recumbency, stiffness, and caution.

6. Congested mucous membranes (not always present).

7. Rising pulse, with few exceptions, combined with a falling temperature and very variable respirations.

Treatment.

One should first consider, as far as possible, which of the following conditions exists in addition to *atony:* acute gastro-intestinal catarrh; impaction of the omasum or abomasum; overloading of the rumen and reticulum—the usual condition; and the extent to which gastro-enteritis may have developed. In all cases of primary indigestion from overloading, or eating spoiled food, the chief object is to overcome the paresis of the rumen and intestines, and to evacuate the contents of the digestive tract. To avoid more serious trouble, all food should be withheld until both of these effects have been accomplished, for a relapse is not infrequent when the patient is allowed access to food. The average case responds promptly to a laxative, combined with anti-ferments (anti-zymotics), carminatives, and stimulants.

Laxatives. Magnesium sulphate, lbs. i.—ii., aloin ℥iv., or ol. lini Oii. are effective. A good combination consists of equal parts of castor oil and light cotton-seed oil or liquid petrolatum (paraffinum liquidum); for this purpose an inexpensive mineral oil (white rose oil) is equal to the most refined products. The action of liquid petroleum is said to be considerably increased by the addition of two drams of croton oil to the gallon. The oil may be repeated every twelve hours in quart doses until the evacuations are satisfactory or the development of the case indicates a change. In obstinate cases, where the actual nature of the condition may not have been definitely determined, and the continued use of laxatives seems indicated, it is well to choose one that is effective and non-irritating, such as a vegetable oil or mineral oil, for the strength of the patient must be carefully guarded. In addition, one may administer potassium antimony tartrate ℥iv. in capsule, or barium chloride ℥iii. in a capsule or a pint of water. At present the combination of these two drugs as recommended by Carr is widely used; 30 grains each of barium chloride and tartar emetic in half a pint of water three times at six-hour intervals. The action of barium in inducing contractions of the rumen is very effective, and in many cases of indigestion one may rely upon its action alone. In a case of overloading due to eating slightly rotten potatoes left in the field, Udall gave, in addition to salts and oil, eighteen 30-grain tablets in a 24-hour period before satisfactory contractions were obtained; this would appear to be an enormous dose, and it is doubtful whether the tablets actually contained 30 grains of barium chloride. Other rapid purgatives, such as arecoline subcutaneously, proved less satisfactory than barium.

Massage of the rumen by means of kneading movements from below upwards in the left flank materially assists the action of laxatives, and, when these are not obtainable, may be sufficient to re-establish normal contractions. Kneading may be applied at frequent intervals of from fifteen to thirty minutes, unless it causes obvious distress.

Anti-ferments and intestinal antiseptics are useful in the control of tympany, due to active fermentation; examples, formalin ℥iv., shaken in a pint of milk, creolin ℥iv.—viii. in a capsule, oil of turpentine, ℥i.—iii., or fluid extract of capsicum ℥ii.—iv. Some who have used pine oil ℥ii.—iv., administered with a dose syringe, prefer it to any of the others.

Stimulants are useful in all cases. Udall's routine method is to prescribe one-half to one ounce doses three times daily, of equal parts of the following:—

No. 1. Arsenii trioxidi gram. 0.5; acid. hydrochlor. dil., gram 3.0; water to make 50 grams.

No. 2. Water 980 c.c.; acid. hydrochlor. dil. 20; strychnine sulphate 10. Mix and heat.

In addition one may administer ammonium carbonate ℥i.—ii., or camphorated oil ℥i.—ii., and prescribe spirits ammon. aromat.

Excessive impactions, found in cows that have had accidental access to green fodder, grain, or meal, and that have overeaten so heavily that contractions and evacuations cannot be accomplished by the usual method, require more prompt and effective measures. If the contents are dry and heavy, with little fermentation, the mass should first be softened and mixed by artificial means. This is accomplished by pumping several pailfuls of warm water into the rumen, either through a stomach tube passed into the rumen or held in the mouth while the cow swallows, or through a trocar in the left flank. Vigorous massage should then be applied to the left flank. In a few minutes eructations occur, contractions of the rumen are re-established, and general improvement follows. One should also administer laxatives, carminatives, and stimulants, as in the usual type. This method may be effective, but in overloading with a heavy fermentable mass, such as lucerne, it may be too slow. One may then resort to rumenotomy, with removal of the contents through the flank. Udall found that the removal could not be successfully carried out through a specially-constructed trocar, except when the rumen was filled with fine material like grain. When it is coarse one may introduce quantities of water, and be unable to get back either water or contents, and this would tend to aggravate the condition.

Extreme tympany with impending death from suffocation may require immediate incision of the rumen. The contents rush out with considerable force, and although the life of the patient may be saved, healing is prolonged, and usually leaves an

adhesion between the rumen and the abdominal wall; this, however, does not interfere with digestion.

Paresis and coma-like symptoms may respond as promptly as parturient paresis to inflation of the udder with air. If the animal is unable to swallow, the usual treatment for indigestion is followed, using oil as a laxative and maximum stimulation. One may use three to four quarts of black coffee and 60 c.c. of camphorated oil daily. This may be supplemented with strychnine.

Following an attack of indigestion a patient may be left suffering from bowel catarrh. This condition usually responds to half-ounce doses thrice daily of the following:—℞. Sal. carolini factitii ℥xvi., gentianæ et nucis vomicæ aa ℥viii., or one may prescribe the solution of arsenic and strychnine previously mentioned.

Report of Committee on Meat Inspection.

Summary of Conclusions.

The report of the Departmental Committee of the Ministry of Health has been published. Their conclusions are summarised as follows:—

(1) The occupiers of all private slaughterhouses should be required to obtain an annual licence from the local authority. If other persons than the occupier use a slaughterhouse they should obtain a separate licence authorising them to slaughter at that place.

(2) Subject to certain exceptions, the slaughter of cattle and other animals intended for human food should be prohibited save on licensed premises.

(3) All purveyors of butchers' meat for food should be registered with the local authority, who should be authorised to make regulations as to the sanitary condition and cleanliness of premises used for storage and sale of butchers' meat and of the appliances used therein, and for the prevention of the contamination of the meat.

(4) Persons affected by an adverse decision of the local authority should be given a right of appeal to a Court of Summary Jurisdiction against the decision.

(5) Adequate notice should be given to the local authority of intention to slaughter so as to facilitate inspection of the carcase at the time of slaughter or shortly afterwards.

(6) We recommend the adoption under the supervision of the Minister of Health of a system of marking of meat which has been duly inspected at the place of slaughter.

Under this system the butcher would cease to be liable to proceedings if inherent disease were discovered in any carcase in his possession which had been duly marked in accordance with the system, though he would still be responsible for the condition of the meat.

(7) We consider that meat inspectors should be of two grades, the one competent to detect abnormalities and to deal with ordinary cases of disease, and the other capable of deciding in cases of difficulty.

(8) For the guidance of inspectors we have prepared a schedule of instructions on meat inspection.

(9) The curriculum of meat inspectors' examinations should be under the supervision of the Minister of Health, and local authorities in charge of markets or large abattoirs should be urged to give facilities for demonstrations at which inspectors and candidates for meat inspection certificates could attend.

(10) The law in operation in London dealing with the inspection and seizure of unsound food should be applied to the whole country, with any amendments which administrative experience has shown to be required.

(11) The number of existing private slaughterhouses needs to be reduced in order to facilitate better inspection, and to this end local authorities in consultation with the meat traders of their areas should prepare schemes for the concentration of slaughtering.

(12) We are satisfied that under present conditions the transport of meat by rail offers frequent grounds for complaint, and we commend to the consideration of the Minister of Transport the complaints we have received on the subject.

(13) Regulations should be made requiring the use of cleanly methods in regard to the transit of meat by road and its removal from wholesale markets.

(14) The majority of the Committee do not recommend the payment to butchers by the State or by local authorities of compensation in respect of animals found on slaughter to be diseased, but are in favour of the establishment of organisations for insurance against losses so sustained. Local authorities might be authorised to give limited financial assistance to such organisations in cases where a satisfactory concentration of slaughtering has been attained.

The four meat trade representatives in the course of a series of reservations put forward a proposal in favour of granting compensation to the owner of a carcase confiscated or wholly destroyed on account of tuberculosis, provided that the animal had a good appearance before slaughter, was well nourished, and exhibited no visible sign of tuberculosis.

Royal (Dick) Veterinary College.

Dr. O. Charnock Bradley, the principal of the Royal (Dick) Veterinary College, Edinburgh, in his report on the work of session 1920-21, indicates that the number of students in attendance was even greater than during the previous session, when it was unusually high. The students attending during the session came from twenty-three counties in Scotland, twenty in England and Wales, and five in Ireland, as well as from Canada, Australia, South Africa, and India. Candidates to the number of 161 presented themselves for the several examinations leading to M.R.C.V.S., and of these 73·9 per cent. were successful, twenty obtaining honours.

It is noteworthy that in the same week as the Ministry of Health Committee report in favour of the licensing of all retailers of meat the order issued under D.O.R.A. should have been revoked, which made it necessary to have a licence.

The Veterinary Record.
5th November, 1921.

REPORT OF THE DEPARTMENTAL COMMITTEE ON MEAT INSPECTION.

Elsewhere we publish the Summary of Conclusions of the Departmental Committee appointed to consider and report upon the Legislative and Administrative measures necessary to secure adequate protection for the health of the people in connection with the Slaughter of Animals and Distribution of Meat for human consumption in England and Wales.

The summary consists of fourteen points, all of which are highly interesting, particularly number 7, which suggests a considerable advancement in the appreciation of the necessity for veterinary assistance. Unfortunately it is not possible to give a complete review of the report, but its perusal is well worth the while of all who are even remotely interested in the subject of Meat Inspection. After dealing in a general manner with the lack of uniformity, variation in amount of inspection and variation in judgment, the Committee arrive at several general conclusions. With regard to the qualifications of inspectors the Committee agree that "the ideal staff for meat inspection work would consist of men possessing a considerable knowledge of pathology, both human and animal, but the cost of such a staff would be prohibitive." As an alternative they suggest that the staff should consist of officers of two grades:—

"(*a*) Lay inspectors who possess sufficient knowledge of the work to be able—

1. To recognise abnormalities;
2. To decide and interpret a definite schedule of meat inspection; and
3. To recognise cases, the decision in respect of which requires more expert knowledge than they possess.

"(*b*) Expert meat inspectors appointed for a large area who would generally supervise the work of the lay inspectors and who would assist in cases of difficulty."

The Committee go even further and suggest a means whereby such expert meat inspectors may be forthcoming.

"In many of the larger towns veterinary work in connection with the milk supply and tuberculosis amongst cattle has resulted in the appointment of a veterinary officer attached to the health department, and to these officers might well be given the duties of the expert meat inspector. In the rural and smaller urban districts it would be advantageous if the services of the county veterinary officers appointed for similar purposes to those in the larger towns could be utilised for the purpose, and we hope that the County Councils whose officials already co-operate with those of the smaller local authorities in various other matters would be willing to facilitate such an arrangement where circumstances permit it."

As a compromise, at a time when it is well-nigh impossible to obtain sanction for fresh appointments, such a scheme would undoubtedly help to safeguard the public health, but it is certain that there are relatively few instances in which the already overworked veterinary inspector has sufficient time at his disposal to undertake the additional work.

The Committee appears to have been unaware of the fact that all graduates of the R.C.V.S. have undergone a practical course of training in meat inspection, for they suggest that—

"In the case either of medical officers or of veterinary surgeons having responsibility for meat inspection work, it is desirable that they should have received a course of practical instruction in meat inspection, and we submit the point for the consideration of the bodies responsible for the examinations for the diplomas for public health or State medicine."

An important point in connection with right of entry to which reference has not infrequently been made by veterinary surgeons is at last recognised, for the Committee recommends that—

"In order to give effect to our recommendations the existing law needs to be amended so as to give to the veterinary officer appointed for purposes of meat inspection, or to a meat inspector who is not a sanitary inspector, the statutory right to enter premises and inspect and seize unsound food, which at present vests only in the medical officer of health or the sanitary inspector or inspector of nuisances."

Appendix 11 is a memorandum on a system and standard of Meat Inspection submitted to the Committee by a sub-committee consisting of Dr. W. J. Howarth, C.B.E., M.D. (Chairman), Dr. A. W. J. MacFadden, C.B., M.B., and Mr. T. Parker, F.R.C.V.S., and sets forth *inter alia* that—

"The efficient working of the system pre-supposes that the men engaged in meat inspection will hold some sort of certificate of competence, granted by a recognised body after adequate training and a sufficient examination. It assumes, furthermore, that there will be available in each district an expert, possessed of the requisite pathological knowledge, whether a veterinary surgeon or a medical officer of health. There may be both."

The necessity for a veterinary surgeon is further recognised, for—

"Par. A. (*Ante-mortem inspection*) suggests that when practicable, ante-mortem inspection should be undertaken, and that the decision as to the nature of the illness from which an animal is suffering would properly devolve upon a veterinary surgeon."

Under the heading "Duties of Slaughtermen," in connection with emergency slaughter, paragraph (III.) provides that—

"Notification of intention to slaughter animals for emergency reasons should be forwarded to the veterinary inspector, meat inspector, or medical officer of health . . ."

while paragraph (IV.) states that—

"When any dead or moribund animal is admitted into a slaughter house, immediate notification of the fact to the veterinary inspector, meat inspector, or the medical officer

of health shall be made by the owner or person in charge of the animal . . ."

The importance of this report is worthy of due appreciation by the veterinary profession, for an attempt appears to have been made to allot to the veterinary surgeon a position which is his by virtue of his training. It is true that there are several glaring omissions and compromises, but the recommendations are undoubtedly a step in the right direction.

Credit must be given to Mr. Thomas Parker, F.R.C.V.S., a member of the Committee, and to Mr. T. Dunlop Young, O.B.E., M.R.C.V.S., and Mr. J. R. Hayhurst, M.R.C.V.S., who gave evidence before the Committee for the several recommendations which obviously are due to their knowledge of existing conditions.

Sir John McFadyean.

An Apology.

The solicitors for Sir John McFadyean, M.B., LL.D., etc., have called our attention to an anonymous letter signed "Progress" which appeared in our issue of the 13th August last, and have pointed out that certain statements contained therein cast serious imputations upon the professional honour of Sir John McFadyean. We desire to express our extreme regret that such a libel should have been published in this Journal, and especially that such statements should have appeared in reference to Sir John McFadyean, who is universally esteemed and respected in the profession. We assure him that the Council of the National Veterinary Medical Association and the Editor of the "Veterinary Record" entirely dissociate themselves from the statements contained in the letter, which we believe to be devoid of any foundation and entirely unjustified. The letter in question would never have appeared had the Editor seen it, but unfortunately he was away on his holiday at the time, and the letter was carelessly inserted by a subordinate. We have agreed, in addition to making this public apology, to pay a sum by way of damages which Sir John McFadyean will, we understand, pay as a donation to the Victoria Veterinary Benevolent Fund, and we have also paid Sir John McFadyean's solicitors the costs to which he has been put.

Abstracts and Reviews.

Sex Determination.

Not many years have elapsed since biologists quite generally entertained the opinion that sex determination did not occur at the time of the fertilisation of the ovum. It was held that Nature did not decide this important matter until the embryonic stage was fairly well advanced. This belief was strengthened by the fact that the Wolffian ducts and the Mullerian ducts—forerunners of essential portions of both the male and the female generative organs—are present in all normal embryos, and it was supposed that, after a decision had been arrived at, one set of sex organs progressed to full completion, while the embryonic structures representing the generative organs of the opposite sex underwent no further development and became atrophic.

In the male, the Wolffian ducts go to form the excretory channels of the testicles, and vestiges of the Mullerian ducts are represented by the uterus masculinus. In the female, the Mullerian ducts develop into the Fallopian tubes, the uterus and the vagina, and vestiges of the Wolffian ducts are represented by the parovarium and the canals of Gaertner, found in either side of the walls of the vagina.

The fact that hermaphroditism occasionally occurs apparently corroborates the hypothesis of delayed sex determination and might lead to the supposition that the condition is referable to indecision on the part of Nature, resulting in the partial or imperfect development of both male and female generative organs.

Although it must be admitted that embryos do possess elementary structures from which organs of either sex may develop, this is not proof that sex was not determined at the time of the fertilisation of the ovum. Neither does hermaphroditism prove delayed sex determination, for the reason that certain influences might be brought to bear upon the growing fœtus, which could interfere with or modify the normal development of sexual organs, in spite of definite sex determination at the time of conception.

In the light of more recent investigations it would seem that sex determination takes place simultaneously with the fertilization of the ovum.

The scope of this paper will not permit of reviewing the phenomenon of mitosis in ordinary tissue cells, the important details of which are more or less familiar to all. Suffice it to say that the present-day theory of sex determination is based in part upon this phenomenon.

A certain definite number of chromosomes have been demonstrated in the nuclei of the body cells of different species of animals. For instance, man has 48, the hog has 40, *Ascaris megalocephala* has 4, and one of the grasshoppers has 14. These numbers apply to the chromosomes of tissue cells, but not to those of the ova and the spermatozoa, the so-called functional reproductive cells. The reproductive cells undergo a process of maturation so that finally they contain only half the definite number of chromosomes required by the tissue cells of the species. The reason for this reduction is that while a tissue cell containing, say, 40 chromosomes, divides so that each chromosome is split into two, each resulting in a daughter cell containing the original number of 40, it should be remembered that the chromosomes derived from the nuclei of both the ovum and the sperm cell are present and take part in the phenomenon of fertilization. Therefore only half the number of chromosomes is needed from each source to make up the total required by the body cells of the species.

It will be noted that cell division in growing tissue cells is a much simpler process than the phenomenon of the fertilisation of an ovum by a sperm cell. The latter implies either fusion of the individual chromosomes or their arrangement in such a manner that when cell division takes place, half of the chromosomes furnished by the ovum and half of those derived from the sperm cell will be present in each of the two daughter cells, marking the beginning of a new being embodying the hereditary properties of both parents.

Investigators have shown that in a certain variety of grasshoppers the cells taken from different tissues of males contain six pairs of chromosomes of similar appearance and one chromosome differing from the others, making a total of 13. The tissue cells of females show seven pairs of chromosomes, six pairs of which are apparently like the six pairs found in the male, and one pair resembling the odd or thirteenth chromosome of the male, making a total

of 14. The female reproductive cells before their division into the functional reproductive cells (ova) contain the same number of chromosomes as the tissue cells just mentioned. However, after the final division the mature ovum contains only seven chromosomes, six of which are alike, and one odd one, which represents, of course, one-half of the six pairs of similar chromosomes and the one pair of odd chromosomes found in the reproductive cell before its division to form the functional reproductive cell. As already stated, the tissue cells of the male contain thirteen chromosomes, which number applies to the reproductive cells before the final division into the functional reproductive cells, the spermatozoa. It is evident that there must be two kinds of sperm cells occurring in equal numbers; one kind containing seven chromosomes, the other containing six, as a result of the division of a reproductive cell containing six pairs of chromosomes and one odd chromosome, or thirteen in all. If an ovum which invariably contains seven chromosomes is fertilised by a spermatozoon containing six chromosomes, an individual will develop containing thirteen chromosomes in its body cells, therefore a male. On the other hand, if an ovum is fertilised by a spermatozoon containing seven chromosomes, an individual containing fourteen chromosomes in its body cells, or a female, is the result. The odd chromosome in the ovum and the odd chromosome in the female determining spermatozoon are referred to by biologists as the accessory, or X, chromosome. In the human, according to Van Winewarter, the male-determining sperm cell contains twenty-three chromosomes, while the one determining female sex contains twenty-four.

The matter of "identical twins" is interesting on account of the probable relationship to sex determination. In ordinary twins two ova are fertilised. These ova result from the rupture of two Graafian follicles in the same ovary, or from two Graafian follicles, one of which is situated in each ovary. Three possibilities are presented. First, each of the two ova may be fertilised by a male-determining sperm cell, resulting in twin males. Second, each of the two ova may be fertilised by a female-determining sperm cell, resulting in twin females. Third, one of the ova may be fertilised by a male-determining sperm cell, and the other ovum may be fertilised by a female-determining sperm cell, resulting in twins, one a male, the other a female. On the other hand, "identical twins" are the result of a complete division of one ovum or blastoderm, resulting in the formation of two distinct embryos. As sex was determined when the ovum was fertilised, prior to its division, the twins are of the same sex. Each has its own amnion, but they are inclosed in one chorion. The common chorion is considered proof of this form of pregnancy.

A prominent writer on the subject of genetics recently made the following observations:—

Breeders of dairy cattle in particular often become discouraged with a bull which seems to sire largely bull calves. It must be remembered in this connection, however, that rather large departures from equality may occur simply by chance. Thus if a coin is tossed twenty times, the best expectation is ten heads and ten tails, but about once in forty times a departure as great, or greater, than fifteen heads or tails is to be looked for. Thus a large number of dairy cattle breeders may be expected to get fifteen or more bull calves out of twenty calves born. Such a result in one year would not have the slightest effect on the sex ratio the next.

Another well-known authority states that "sex seems to be determined by one of the chromosomes, and is probably settled at the time of conception. The determination of sex is therefore a matter of chance over which the breeder has no control. For practical purposes, the breeder will find that, over a period of years, he gets nearly equal numbers of both sexes."

Reference has been made to elementary structures known as the Mullerian ducts, found in all normal embryos. In animals having rather prolonged periods of gestation such as the mare and the cow they appear early in the second month of pregnancy as two rods of mesoblastic tissue arising in the right and left sublumbar regions, converging caudally in the form of a V near the posterior common body opening or cloaca. The rods become hollowed out to form tubes, and near the end of the second month the extremities of the ducts, which already are in contact with each other, become fused. The coalescing of the two tubes—right and left—results caudally in the formation of a single medial tube, the length of which depends upon the extent of the fusion; and the structures which at first resembled a V in form now resemble the capital letter Y. The opening of each duct into the peritoneal cavity in the sublumbar region represents the future ostium abdominale of the Fallopian tube. The fused medial tube represents the future vagina and, in those species in which the fusion progresses beyond this point, the body of the uterus.

The following observations relative to the uteri of various species are taken from Williams's *Veterinary Obstetrics*:—

Derived from the ducts of Muller, it (the uterus) varies greatly in form and disposition, partly dependent upon the degree of fusion between these two structures. There are generally recognised a uterine body and two cornua, each having essentially like functions in varying degrees.

In the rabbit there exists no uterine body, but two distinct tubular uteri, opening separately into the vagina. In the bitch, cat and sow the uterine body is limited in extent and physiologically unimportant, rarely containing even a portion of a fœtus, except in transit at the time of birth, while the two cornua are extensive, and in them develop virtually all fœtuses, so that, physiologically, they represent the two separate uteri of the rabbit.

In ruminants the uterine body becomes markedly greater in size, and assumes far higher importance physiologically, while the cornua remain relatively large. In these animals the one, two, or more fœtuses habitually rest almost equally in the body and cornua, so that they represent a middle point in the transition between the double uterus of the rabbit and the single uterus of woman, physiologically devoid of cornua. In the mare the uterine body becomes relatively more important than in the ruminant.

The relative importance of the cornua to the uterine body sustains a close relation to the number of young brought forth at a given birth. In multiparous animals there are two uteri, as in the rabbit, or the two extensive cornua with a functionally unimportant uterine body, as in the bitch, cat and sow. In ruminants, which are largely biparous, the uterine body and cornua become approximately equal in extent and function.

In the normally uniparous mare the cornua are smaller than the body, while in woman the uterus is virtually without cornua in size or function.

In the large animals, like the cow, size of the parts readily permits of extensive rectal palpitation and manipulation of the uterus, tubes and ovaries, thereby making it possible to carry out the excellent work that is being done at the present time in the early diagnosis of pregnancy and the treatment of sterility.

["Some observations relating to sex determination and the Embryology of the Uterus." FOSTER, J. P., *Journal Amer. Vet. Association*, October, 1921.]

Clinical and Case Reports.

The Editor will be glad to receive from members and others contributions to this column of reports of interesting cases.

A Double Dose of Milk Fever.

By E. MARRISON, M.R.C.V.S., and K. A. MILES, M.R.C.V.S., Bakewell.

Subject.—A good class dairy shorthorn cow, fair condition; about 7 years old.

History. — This animal calved on September 5th, 1921, and on September 6th, 1921, was found down with milk fever. After the usual treatment she made a quick recovery. She gradually increased her milk supply until she was giving six gallons a day.

Course.—On October 14th, 1921, the owner sent in a message, at 2 a.m., to say that the same cow had got milk fever again. On arrival it was ascertained that this cow had been " off the hooks " for a couple of days, and that her milk yield had considerably diminished.

Late that night she was seen to be staggering about in her loose box, and, in fact, showing the usual signs of milk fever. After careful examination, milk fever was diagnosed. The usual treatment was carried out, and the visit next morning found the animal in a nearly normal state of health. She has now made an uninterrupted recovery, and looks like giving as much milk as before.

Considering the length of time that elapsed between the first and second attack of milk fever, namely, 38 days, this must surely be a unique case.

It might also be mentioned that, a few years ago, a cow, which presented unmistakable signs of milk fever, and also made a rapid and complete recovery, had been calved exactly thirteen days.

Pyosalpingitis and the Surgical Treatment thereof.

By G. E. JORGENSON, Iowa.

Patient.—A four-year-old pure bred Jersey cow.

History.—Had been bred and conceived when at the age of three years, the pregnancy terminating in parturition after a normal and uneventful duration. The birth, however, was quite pathological, presenting both a maternal and fœtal dystokia as follows:—There was present an anterior presentation in the dorso-pubic position with a lateral deviation of the head in the right ilio-cephalic position with both front feet engaged in the pelvis. Repulsion and version corrected this, and delivery of a live, well-developed calf followed. This calf developed acute enteritis and pneumonia within twenty-four hours, in spite of the fact that it was not allowed ro receive any nourishment and had been given several enemas to clean out the digestive tract and one dose of calf-scour serum. It died in two days. Cultures from the lungs and intestines showed two streptococci, one of the *viridans* group and the other a green-producing, hæmolytic, long-chained variety.

The cow revealed extensive placentitis and metritis with retained placenta and considerable uterine discharge. No attempt was made to irrigate the uterus, but instead, capsules containing zinc oxide and iodoform were placed deeply within its cavity every three days. In seven days the placenta was removed, and the uterus showed enough involution in four days thereafter, so that it could be douched and the fluid siphoned out. After about four weeks' treatment the uterus and cervix were so nearly normal that the patient was discharged from treatment.

Symptoms.—Three months after parturition I was called to see her again, for the reason that she had shown no signs of estrum. Vaginal examination revealed a normal cervix firmly contracted, with no signs of any inflammation or discharge. Rectal examination revealed a cystic corpus luteum in the left ovary. It is an established fact that cystic degeneration of the corpus luteum indicates an infection of the oviduct at time of rupture, which points to tubal infection on the side where present. Hence, for fear that rupture of the cyst at this time would further infect the adjacent tissues, treatment was confined to a careful dilatation of the cervix and irrigation of the uterus with normal salt solution. A small amount of flocculent muco-pus was siphoned out. Irrigations were carried out once a week for three weeks, at which time the writer was called away and was absent for three weeks. Upon his return, the patient was examined and showed an extensive enlargement of the left tube with considerable adhesion of the pavilion to the ovary. The right ovary was normal, as was the tube as far as palpation could indicate. A diagnosis of pyosalpinx was made, and as the breeding efficiency of the animal was nil in the present condition, surgical interference was advised, cause for such action being based upon the radical treatment of pyosalpinx in women.

Operation.—The operation was carried out as follows:—

The animal was given 1½ ounces of chloral after being dieted for twenty-four hours. One hour after the administration of the chloral the animal was secured in the stocks in such a manner that it could not lie down, and an area twelve inches in diameter on the left side was shaved and cleansed in the usual surgical manner, after which an incision was made through the skin and underlying fascia down to the abdominis externus as far back as possible and about eight inches in length. Following this, the external abdominis obliquus was divided in the direction of its fibres, while the internal was incised with the scalpel in the same direction as the external. The left tube and as much of the cornua as could be brought out were then exposed through the incision and the ovary and tube freed from the suspensory ligaments. Following this the tube was clamped off at its uterine termination and severed from its attachment thereto, after which the stump was cauterised with pure phenol and a purse-string suture inserted in the serous coat and the tip or stump pushed in, similar to the technique employed in an appendectomy on the human. The parts were then returned and the laparotomy wound sutured. The case made an uneventful recovery and is now pregnant.

Remarks.—Pyosalpinx is in the majority of cases bilateral. In fact, out of some forty cases seen by the writer this is the first one which appeared to be unilateral. If bilateral, surgical intervention is of course contra-indicated. In such cases it is better to leave the tubes alone and concentrate the treatment on the cervix and uterus, in the hope that the tubal infection may not prove so severe that occlusion

occurs. The writer has found that a cystic degeneration of the corpus luteum serves as a fairly constant indication to tubal infection, and this is corroborated by other writers. In this particular case there was a spread of infection by contiguity from the uterus to the tubes, and while the cervix and uterus appeared to be freed from infection and inflammation, there however did exist a chronic salpingitis, and to a lesser degree pyometra. The chronic salpingitis terminated, as it occasionally does, in a tubal abscess. Sections of the uterine end of this tube revealed a complete destruction of the epithelial elements and a replacement with connective tissue, resulting in a complete occlusion of the tube, which extended to within two inches of the tubal abscess. This abscess involved the pavilion, which was entirely adherent to the ovary, which was involved in the abscess.

In this particular case there is another feature of interest. There was in this herd a chain of evidence running back to the bull. The bull came from a herd where genital infection had been rampant, and was finally discarded himself for the reason that he suffered from a partial sterility which gradually became absolute. Examination of this bull showed several pathological features, as follows :—There was present an oligospermia. There were spermatozoa that showed various imperfections such as absence of tails, absence of nuclear membranes or atrophic nuclei and lack of motility, together with the presence of streptococci in the semen. Clinically an enlargement of the seminal vesicles and atrophic degeneration of the left testicle could be demonstrated. Autopsy on this bull later showed a chronic semino-vesiculitis and an atrophic degeneration of the testicles. Later it was learned that this bull had suffered from scours during calfhood. The cow herein described had been bred to this bull and the calf born in dystokia, and later dying from septic enteritis and pneumonia, was its progeny. Cultures from the amputated tube showed the presence of streptococci similar to the cultures obtained from the bull and the calf.

There are two principal outstanding features in this case which serve as a motive for the presentation of this case report. First, an infection which can be traced back to the sire and from him to an infected herd, where he originated, and later progressing in the form of an unbroken chain to a future generation, demonstrating the part played by the male in the transmission of genital infections and the ultimate chaotic results following in the dam and offspring. Secondly, that tubal diseases can be successfully controlled when unilateral, although such surgical intervention is very difficult due to the general inaccessibility of the genitalia in cows through laparotomy.—*Journal American Veterinary Association.*

Owing to the success of a veterinary expert, M. Carlier, in combating cattle plague in Belgian Ruanda, the establishment of a veterinary school for the local natives is being considered by the Belgian Government.

Association Reports.

The Southern Branch of the National Veterinary Medical Association.

Discussion on "Bovine Abortion and its Control."

The first meeting was held at the Royal College of Veterinary Surgeons, 10 Red Lion Square, London, W.C., on Wednesday, October 12th, 1921, Mr. McIntosh, in the absence of the President, being voted to the chair.

The following members were present:—Messrs. J. W. McIntosh, F. W. Willett, G. H. Livesey, E. Whitley Baker, Frederick G. Samson, J. Willett, G. W. Kerry, T. F. Hogben, Wm. T. D. Broad, W. L. Little, C. A. Powell, Prof. W. A. Wood, H. A. Hogben, S. C. J. Bamber, Esmond Brown, Hugh Cooper, Hugh A. MacCormack, Prof. Geo. H. Wooldridge (Hon. Treas.), T. J. Bosworth, F. Young, Prof. E. Brayley Reynolds, J. Bell, Prof. Hobday, W. S. King, H. S. Slocock and G. P. Male (Hon. Sec.).

Prof. J. T. Edwards, in introducing his paper, "Bovine Abortion and its Control," said he had endeavoured to present as briefly and as faithfully as possible what was now actually known with regard to abortion, and particularly with regard to the common contagious form of abortion in cattle—the disease caused by a specific bacillus—the *bacillus abortus Bang*. There was no question about the importance of the disease, which, together with tuberculosis, was the most formidable disease to livestock. In the past tuberculosis had claimed most attention, largely on account of the fact that it was transmissible to man. From the economic standpoint, however, there could now be but little doubt that the disease of contagious abortion was the most important in connection with livestock in civilised countries.

He had been reproached for having introduced into the paper rather too many technical terms, but in preparing it he had endeavoured as far as possible to rid it of such terms as would not be intelligible to the practitioner. However, unfortunately some technical terms had crept in inevitably, because in dealing with the condition one had to consider two living organisms—the cow on the one hand and the bacillus on the other. It was only by studying the intimate relationship of those two organisms—in other words, their biology—that some means of combating the disease could be hoped to be arrived at.

His main theme throughout the paper had been that there was no royal road towards the eradication of contagious abortion in cattle. There was no cure, nor was there likely to be one, for the reasons stated in the paper. Again, there was no single uniformly successful or universally applicable method of preventive treatment. Each outbreak had to be dealt with on its own particular merits, having regard to what was known as to the origin and spread of the disease. There were three main methods of con-

trolling the disease, namely, by legislation, by vaccination, and by isolation or quarantine measures.

Dealing briefly with the first of those methods, namely, control by legislation, or State control, one had to admit at once that such measures must, in the very nature of the disease, be only partial, for two main reasons. The first, and a very important one, was that the disease had now spread to such an extent throughout the country that any measures formulated with a view to arresting its spread efficaciously would inflict too great hardships upon the stock owners. The Departmental Committee on Epizootic Abortion in its report had formulated rather stringent measures for the control of the disease, but now even the members who had sat upon that committee had had to admit that the disease had spread to such an extent that such measures would no longer be applicable. Secondly, the measures must necessarily be partial, because of the fact that the disease was not one that could be diagnosed except by means of a laboratory test. Ordinarily the only outward manifestation of the disease was the act of abortion, but numerous researches had proved that abortion was not a constant phenomenon in diseased cattle, and that even when abortion had ceased the infected animals might harbour the organisms in their system for many years, and that, while they were in that condition, they might still act as potential carriers of the disease. However, if the measure which had been issued by the Ministry of Agriculture during the present year was strictly adhered to, then it would have as its effect the curtailing of the spread of the disease to a very large extent, on account of the fact that it would eliminate the chief source of spreading. The disease was spread mainly by the recently-aborted cow. It had been proved that the organisms might be voided from her genital passages from a few days to three weeks after the act of abortion, and it was also transmitted by ingestion. If therefore the provisions of the Order were strictly enforced, one of the sources of danger would have been dealt with. But, as he had said at the beginning, State control could only, from the very nature of the disease, be partial.

Coming to vaccination, that was now a most powerful weapon in the armoury of a veterinary surgeon in the fight against contagious abortion. Available statistics had proved that the incidence of the disease diminished to one-fourth or one-fifth in infected herds. Vaccination entailed inoculation of non-pregnant animals with the living organism. The inoculation was best performed about two months or so before service. That had been usually recommended. However, it now transpired that young pregnant animals could apparently be inoculated with impunity during early pregnancy, but as the animal matured the danger increased more and more, until, in the case of adult cattle, the interval recommended should be imposed. Vaccination entailed inoculation with living bacilli. Vaccines prepared with dead organisms were not of any appreciable value. Therefore vaccination implied keeping alive the disease. It might bring about the cutting short of outbreaks, but it had as its result the maintenance of the infection in the herd, and not its suppression. Perhaps it would be going rather far to say that it was in reality a measure of despair. In certain circumstances vaccination had proved to be of the greatest value, but it was not a process which should be lightly undertaken. It should be undertaken immediately it was anticipated that other measures would fail.

With regard to segregation and the application of quarantine measures, little need be said. It simply implied the separation of the diseased animals from the healthy animals in the herd and strict isolation of infected animals. In order that the isolation might be complete and effective, it was necessary to have separate buildings, separate pastures and separate attendants. The process, therefore, was expensive, and could only be employed where facilities were available. But in the case of more valuable herds it should be insisted upon before vaccination was resorted to. It could best be applied in certain circumstances, namely, first in keeping the herds clean and at the beginning of outbreaks where only one or two animals had aborted. It might be asked, how is one to detect the presence of the disease in the herd, and how far can one detect that it has already spread? Fortunately there was at hand a most valuable and accurate method of diagnosis, namely, the agglutination test, by means of which it was possible to pick out with certainty the infected animals in a herd. But that test had the limitation that it took some time after infection before the reaction was demonstrable in the blood of animals. The interval might extend to three weeks or more. If that was taken into account, then one could easily devise measures for eliminating or separating the diseased animals from the healthy ones. It had also to be borne in mind that the tests would show that animals which had aborted might at the time of an abortion fail to react to the test. The disease appeared at some time or other, after admission into the body, to invade the chorion very quickly, and to set up such extensive alterations as to produce abortion before a reaction could be observed in the blood. In order that the best use might be made of the test, it was necessary to apply it during the very early stages of an outbreak. Careful observations had shown that there were comparatively few other causes of abortion than the bacillus of Bang. Sporadic cases had occurred. They were not unknown, although abortion due to accidental causes was so rare as to be almost negligible in cattle. Infectious abortion due to other organisms also occurred, but such cases were comparatively rare. A contagious abortion which might assume an enzootic character was also known, due to an organism which was the common cause of abortion in sheep. But a safe rule was to regard all cases of abortion as of the common contagious kind, until the contrary was proved, and that could be proved by means of the agglutination test. If that test was applied early during the out-

break, it might be easy to check the spread of the disease in a herd by the application of quarantine measures. Also by means of the test a herd could be kept clean if care was taken to apply the test to all animals purchased for admission into the herd. M'Fadyean had stated in one of his writings that the stage had now been reached when a man should be considered guilty of gross neglect if he allowed the disease to be introduced into his herd. Animals purchased into valuable herds should only be bought on a warranty that they had passed the agglutination test. It might be necessary—perhaps it would be wise—to apply the test again in two or three weeks' time after keeping the animal in quarantine.

There were, therefore, three main measures of dealing with the disease, namely, State control, which could only be partial; vaccination, which was useful, but which must not be resorted to lightly; and segregation.

Of recent years a good deal of exact information had been obtained with regard to the nature and methods of the spread of the disease. It was now known that the common method of infection was by ingestion, and that the bull seemed to play nothing but a subsidiary rôle; in fact, on a careful perusal of the literature one could find no authentic case of transmission by the bull, so much so that bulls even with infected semen failed to transmit the disease to healthy cows.

A remarkable phenomenon in connection with the disease was the comparative immunity of the young. If calves were fed with infected milk, nothing more than a temporary reaction occurred in their blood, and they soon rid themselves of infection. That phenomenon had been well noted by a number of observers.

He hoped practitioners would put to him points upon methods of control which they thought best for the particular circumstances which they had come across in their own practice.

Mr. SAMSON asked Professor Edwards how long he considered the contagion remained in a pasture or in pastures. He (Mr. Samson) had a client who for the past six years had not been able to keep his cows in calf. The client had tried six cows. The first three had aborted twice each. As they were then in good condition, and as meat was fetching a very good price, they were sent to the market and sold for killing. He had advised his client to try a fresh bull with the other three cows. The client then tried two fresh bulls, but with the same result. The last three cows were kept on the same premises and in the same pastures as the first three cows, and they all aborted. His client then had them sold on condition that they were killed for meat. They were all young stock and in good condition.

He understood Professor Edwards to say that the bull did not carry the contagion. He would like a distinct answer from Professor Edwards as to whether he did think the bull carried the contagion or not.

He had been very much surprised to hear Professor Edwards say that there was no cure for the disease. He had come to the meeting in the hope of learning that there was a cure. Perhaps it would come in the course of time.

Mr. KERRY asked whether anything could be done in the way of treatment to bring a cow into calf early again after she had once aborted.

(To be continued).

Southern Counties Veterinary Society.

A business meeting of this Society was held at the Royal College of Veterinary Surgeons, 10 Red Lion Square, London, on Wednesday, October 12th, in connection with the meeting of the Southern Branch of the National Veterinary Medical Association, a report of which appears above. The President (Mr. J. W. McIntosh) took the chair, and the other members of the Southern Counties Veterinary Society who were present in the course of the afternoon were Professor G. H. Wooldridge, and Messrs. E. Whitley Baker, H. A. MacCormack, G. H. Livesey, G. P. Male, S. H. Slocock, F. G. Samson, F. W. Willett and J. Willett.

The minutes of the last ordinary meeting, as published in the *Veterinary Record*, were, on the motion of Mr. J. Willett, seconded by Mr. MacCormack, taken as read and confirmed.

Accounts amounting to £2 1s. 2d. for the printing and posting of the recent circular to non-members were submitted and passed for payment.

It was reported that two applications had been received for membership, namely, from Mr. H. Burrell, of Croydon, and Mr. C. J. S. Macara-Finnie, of Hove; and on the proposition of Mr. J. Willett, seconded by Mr. Samson, these gentlemen were formally elected.

On the proposition of Mr. Samson it was decided to hold a meeting in London during the Cattle Show week as in former years, the actual day to be left to the President and Honorary Secretary, but in view of the fact that the country members had of necessity to leave London early in the evening to get back to their respective towns, it was decided not to hold a dinner in the evening. It was pointed out by the President that there was nothing to prevent the members having lunch together before the meeting, and it was understood that if possible this would be arranged.

The customary vote of thanks to the President for presiding, moved by Mr. Samson, brought the meeting to a close.

The Central Veterinary Society.

ANNUAL MEETING—*continued.*

Votes of Thanks.

Mr. MCINTOSH said he had a very pleasing duty in proposing a very hearty vote of thanks to the retiring

President, Major-General Sir Layton Blenkinsop. With all due respect to those men who had been in the chair during the past years—and he happened to be one of them himself—he thought never before had the Society had a better President than it had had during the session which was now ended. Sir Layton occupied an important position as Chief of the Royal Army Veterinary Corps, and had given up much of his time to the Society. He had not missed one meeting, and had thrown himself enthusiastically into the work in the interests of the profession generally; they owed him a deep debt of gratitude for carrying on the work of the Association during his term of office. The session had been a record one, as would have been observed from the report of the Secretary. There were twenty-two new Fellows, which he thought was a record for the Association in one year, and there was a whole list of honorary Fellows. In honouring those, the Society had honoured itself as well. There was a record attendance at the dinner, 111. Last year, therefore, had been a red letter one. The Society had also met under the auspices of the Royal Medical Society, and that was a great honour indeed. He hoped that now Sir Layton was reduced, as it were, to the ranks, he would still remain with the Society, frequently assisting it in carrying on the work.

Mr. J. WILLETT, in seconding the motion, said Mr. McIntosh had covered the whole subject and left him very little to say, but he would like to call the Fellows' attention to the fact that the past President had been appointed the first Colonel Commandant of the Royal Army Veterinary Corps, and was to be congratulated upon that.

The motion was carried with acclamation.

General Sir LAYTON BLENKINSOP said he hardly knew how to thank the Fellows for the way in which they had received the proposal. When he came to the Society as President he came amongst friends, men he had known for a long time, and everybody had helped him to carry out the duties of President. He had received the greatest assistance from everyone, and more especially from the Secretary, who had always been ready to help to do what was necessary for the benefit of the Society. He felt that a Society like that could do an enormous amount of good, and any little he had done to help it on its way he could assure them had been done with the best endeavour to further the interests of the Society in particular, and those of the profession as a whole.

The meeting then terminated.

HUGH A. MACCORMACK, *Hon. Sec.*

Notes and News

R.V.C. (LONDON) STUDENTS' UNION.

The second general meeting of the Students' Union was held in the New Theatre of the Royal Veterinary College, on Thursday, October 27th. The following officers were elected for the ensuing year:—*President*, Mr. Stableforth; *Secretary*, Mr. Hall; *Treasurer*, Mr. Catmur; *Council*, Messrs. Barry, Bullen, Cornell, Davidson, Gale, Gatfield, Howells, Jackson, Quinn, Searles, Stevens, and Wilkinson.

So far no Common Room has been obtained; but a programme of entertainments has been drawn up.

The Secretary takes this opportunity of reminding all veterinary surgeons that he will be glad to put them in touch with students as pupils, improvers, or senior students as assistants. E. HALL, *Sec.*

TESTING OF CLINICAL THERMOMETERS.

Mr. Kiley recently asked in the House whether the purchaser of a single clinical thermometer could take it to the National Laboratory, Kew, and have it tested. Mr. Baldwin replied that by an arrangement of several years' standing, single clinical thermometers could be tested at the National Physical Laboratory for 1s. 6d. each; for large quantities the fee was 3d. per instrument. Mr. Hailwood (U., Ardwick) asked whether Mr. Baldwin would take steps to introduce some method of testing and certifying clinical thermometers. Mr. Baldwin replied that a Bill for their compulsory testing had been introduced early in the Session, but was dropped through lack of time. He hoped to reintroduce it next Session. Meanwhile most British manufacturers of clinical thermometers were voluntarily having their products tested at the National Physical Laboratory.

THE PURITY OF LONDON'S MILK.

The *Daily Express* is promoting an investigation into the quality of the milk supply of London, and particulars of the first results appear in the issue of October 19th, in an article headed "Water at 9d. a Quart?" Twenty samples of milk, bought in fourteen districts, were submitted to a public analyst. Of these, 25 per cent. were found either to contain added water or to be deficient in fat. This percentage, states the report, is four or five times as high as the average yielded by samples officially collected for analysis in London. Three of the samples contained added water to the extent of 18 per cent., and two were deficient in fat, one as low as 2·70 per cent., instead of the legal minimum of 3 per cent. The results of the analyses and other evidence are to be sent to the Public Prosecutor. This is only the beginning of the *Daily Express* campaign: the next investigation will be of the poisonous bacteria, and still further, a chemical analysis and bacteriological examination of well-known condensed, evaporated, and dried milks.

WARBLE FLY INVESTIGATION COMMITTEE.

Sir B. Stanier asked the Minister of Agriculture in the House recently whether he could now give any information regarding the findings of the Committee to investigate the warble fly problem; and whether they have found any new preventative.

Sir A. Boscawen: The investigations of the Committee appointed to report on the warble fly are not yet completed,

but I am advised that the Committee are very hopeful that an effective preventive against attacks of this pest has been discovered. Experiments have recently been tried with a wash composed of tobacco powder mixed with lime, and very encouraging results have been obtained.

A new arrangement with buyers (including exporters) has been made by Scottish breeders of pedigree shorthorns with regard to re-testing cattle. It has been agreed to have a re-test, within a fortnight after sale, for all animals sold at 100 guineas and over; the selection of a veterinary surgeon to be a matter of mutual arrangement between buyer and seller.

It is stated that, in spite of the extensive use of the tractor and motor-car, there are 44,270 horses in British Columbia at the present time, most of them of the heavy breeds, led by the Clydesdale and Percheron.

Four more have been added to the number of British Friesian cows that have yielded over 2,000 gallons of milk in a lactation period not exceeding 365 days, bringing the total up to 29.

Correspondence.

Letters to the Editors should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Royal (Dick) Veterinary College Commemoration Window.

Sir,—May I crave the indulgence of a small amount of your space to remind your readers of a scheme that was set afoot some time ago by the graduates of the Edinburgh Veterinary College.

At the request of a number of Clyde Street graduates, a meeting was called for the purpose of deciding how best their connection with the old College might be commemorated in the new buildings at Summerhall, and it was determined to fill the three-light staircase window with stained glass.

Intimation of the scheme was made to all those who had been connected with the Clyde Street School, but the war interfered with the prompt carrying out of the scheme.

It is probable that there are still some who would like to contribute small sums to the project, and the purpose of this letter is to inform them that the committee wish to proceed with the scheme forthwith. Before obtaining estimates, however, it is necessary to find out the exact amount of the funds at the disposal of the committee; and I should, therefore, be glad if those wishing to be associated with the scheme would, *without delay*, intimate to me the amount of their subscriptions.—Yours faithfully,

J. PEDDIE, F.R.C.V.S., *Hon. Secretary and Treasurer.*

Moredun, Auchterhouse, Forfarshire.

Modern Roads and the Horse.

Sir,—I have had my attention drawn to your leading article in *The Veterinary Record* of October 15th. In this we read that in one Devonshire village alone fourteen horses had accidents from the slippery roads.

We must all admit that the roads made nowadays are a great improvement on the macadam roads of the past, which in the summer months were covered with dust, and therefore unhealthy, and in the winter months were covered with a thick layer of mud. Owing to the improvements of recent years, the roads are now waterproof and the dust and mud nuisances are very much abated, and in some instances entirely removed. It would be unreasonable for the horse owner to take a stand against this undoubted progress which is for the public good. What we have on our part to do is to provide a foot-hold for the horse, so that he can overcome the tendency to slip on our present roads.

It is a well-recognised fact that horses can take much heavier loads on the modern roads than they could on the old form of road, thus it is a great economic factor in our life to have the roads improved.

We have amongst our advertisements running in *The Veterinary Record* a device known as The Gray's Patent Flexible Bridge Pad, which very greatly minimises the danger to horses from slippery roads. This pad was placed first in a competition open to the world, in which there were upwards of 800 entries, in 1914. It was also found in experiments carried out by the Government during the past year to be one of the most effective devices on the market. I have used these pads for many years, both on riding, driving and van horses. The effect is to give a horse a grip on the glassy road surfaces, and in addition the life of the shoe is greatly prolonged by the prevention of continual sliding, and owing to the latter advantage, it saves its own cost to a very great extent. The adoption of such a device is to my mind sound, both from a business and humane point of view. I think if this were more widely known amongst users of horses, those who prefer driving and riding to motoring would continue to use their cobs and riding horses instead of giving them up owing to the dangers of the slippery roads of the present day. It is possible by the use of these pads to ride comfortably along the high road to a meet of the hounds, as well as to drive in a trap at an ordinary trotting pace, without fear of slipping on the most modern type of roads we have in England to-day.

I am stimulated to write this letter for the dual reasons of introducing something to the horse owner for the sake of the horses, and of helping to attract attention to the valuable advertisements in our paper.—Yours faithfully,

BRENNAN DE VINE.

Birmingham, October 26th, 1921.

County Council Fees: A Suggestion.

Sirs,—Ordinary country practitioners would be glad of some help from the N.V.A. and the R.C.V.S. in getting county councils to pay uniform and reasonable fees to all veterinary inspectors. A revised scale of fees is very necessary and should be uniform in every county. Would it not be possible for the N.V.A. to compose a reasonable scale of fees for all veterinary inspections under county councils? The agreed scale should then be submitted to the R.C.V.S., with the request that the Council should pass a bye-law making it unprofessional conduct for any member to accept an appointment under a county council except at the standardised fees. The scale of fees should not be extravagant, but moderate, and the mileage might be based on ordinary car hire rates. The mileage charges could be reviewed annually in relation to the price of petrol.

All negotiations with the county councils should be carried out by the secretary of the N.V.A., advised by the Council of that body.

The new scale of fees might be looked upon at first by some county councils in the nature of an ultimatum, but it would be subject to negotiation, and once settled would give satisfaction in many quarters where at present only miserable fees are allowed.

Undercutting would be practically excluded and the bad-paying county councils would be compelled to pay the uniform fees.

A profession divided against itself cannot stand against county councils, and individual members should not be expected to fight this battle. Our profession united would gain its point. The medical profession approves of combined bargaining to gain its panel fees, and the veterinary profession should now go into action under its own flag—"*Vis Unita Fortior.*" The movement here suggested would be practical politics for the N.V.A. and the R.C.V.S.—Yours faithfully, R. BARRON, M.R.C.V.S., Blandford.

21st October, 1921.

A Stallion Licensing Complaint.

Sir,—The advent of November always brings a little feeling of apprehension to the minds of stallion owners, lest their animals should have developed any of the defects classified under the heading of hereditary diseases by the Ministry of Agriculture. This feeling, of conrse, is natural, as the possibility of their development is always present.

The list of diseases thus classified as hereditary is generally accepted as being fair and sound; but as the regulations now stand there is undoubtedly a distinct injustice done to a good many horses that develop wind troubles as sequelæ to influenza or strangles, and, if this grievance is allowed to continue, it will do a great deal to thwart the already alarmed Shire breeders, who, on the contrary, should receive every encouragement.

Evidence to the effect that whistling or roaring acquired as the result of influenza or strangles being transmitted to the progeny is lacking—it is against one of the fundamental laws of heredity—whilst evidence to the contrary is established beyond all doubt. If needs be one could give some very definite illustrations.

Would it then not be possible in the event of a sound valuable stallion becoming affected with influenza to report the matter immediately to the Ministry of Agriculture, who could then appoint an independent veterinary surgeon to verify the fact, in case the animal should become unsound as a sequel and not condemned as a result?

In the minds of not a few it is considered that the greatest majority of cases of roaring and whistling result from infective processes, although the symptoms of the latter at the time had not been sufficiently obvious to be detected by the owners. As an illustration, one might mention chorea in the dog following distemper, symptoms of the latter being so slight as to pass observation.

In this way much disparagement and pecuniary loss to the owners and a greater loss to the Shire horse world would be obviated.—Yours truly, Leslie P. Pugh, B.Sc., F.R.C.V.S.

Sevenoaks, October 22nd, 1921.

Army Veterinary Service.

London Gazette, War Office.—Regular Forces.

October 24th, 1921.—Captain C. M. Stewart to be acting Major whilst holding the appointment of D.A.D.V.S., from August 29th to September 9th, 1919.

October 28th.—Major H. C. Welch, having attained the age limit of liability to recall, ceases to belong to the Reserve of Officers (October 29th).

Territorial Force.

October 25th.—Captain J. Anderson (late R.A.V.C.) to be Captain with precedence as from August 9th, 1917 (October 5th).

October 26th.—Captain R. Bennett, F.R.C.V.S. resigns his commission (October 27th), and retains the rank of captain.

Regular Forces (Oversea).

October 28th.—Temporary Quartermaster and Lieut. C. R. Aspden relinquishes his commission on completion of service, and retains his rank (September 1st).

Diseases of Animals Acts, 1894 to 1914. Summary of Returns.

Period.	Rabies. Cases Confirmed. Dogs.	Rabies. Cases Confirmed. Other Animals.	Anthrax. Outbreaks confirmed.	Anthrax. Animals attacked.	Foot-and-Mouth Disease. Outbreaks confirmed.	Foot-and-Mouth Disease. Animals slaughtered or exposed to infection.	Glanders (including Farcy).* Outbreaks reported by the Local Authorities.	Glanders (including Farcy).* Animals attacked.	Parasitic Mange. Outbreaks reported by the Local Authorities.	Parasitic Mange. Animals attacked.	Sheep Scab. Outbreaks reported by the Local Authorities.	Swine Fever. Outbreaks confirmed.	Swine Fever. Swine slaughtered as diseased or exposed to infection
GT. BRITAIN.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Week ended 22nd October, 1921	...	...	12	12	...	...	...	6	8	12	2	26	16
Corresponding Week in 1920	1	...	6	7	...	...	...	...	37	46	3	24	12
Corresponding Week in 1919	2	1	6	12	20	132	...	...	34	53	22	64	23
Corresponding Week in 1918	5	1	3	4	...	...	1	3	24	45	1	27	7
Total for 43 weeks, 1921 ...	22	1	410	526	43	2958	11	41	1845	2813	436	1034	379
Corresponding period in 1920	28	...	343	413	75	9784	11	18	3214	5346	331	1587	645
Corresponding period in 1919	146	5	176	233	49	1762	21	54	4289	8543	260	1917	890
Corresponding period in 1918	45	2	204	235	3	40	28	77	3700	6936	265	1180	463

Note.—The figures for the current year are approximate only. *Excluding outbreaks in Army horses.

IRELAND.											
Week ended 22nd October, 1921	...	...	...	...	...	...	Outbreaks ...	7	2	6
Corresponding Week in 1920 ...	...	...	...	...	...	...	...	6	1	...
Corresponding Week in 1919 ...	...	...	...	...	...	...	1	13	...	1
Corresponding Week in 1918 ...	...	...	...	...	...	...	...	2	2	4
Total for 43 weeks, 1921	1	1	7	77	...	...	70	228	94	530
Corresponding period in 1920 ...	1	1	...	...	1	3	89	280	12	34
Corresponding period in 1919 ...	...	...	...	...	1	1	130	221	30	93
Corresponding period in 1918 ...	2	2	...	...	...	...	92	256	24	76

Note.—The figures for the current year are approximate only.

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